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DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

[Docket No.: 120418419-2419-01]

Request for Information on Proposed New Program: National Network for Manufacturing Innovation (NNMI)

AGENCY: National Institute of Standards and Technology (NIST), Department of Commerce

ACTION: Request for information.

SUMMARY: The NIST-hosted Advanced Manufacturing National Program Office (AMNPO) invites interested parties to provide input on a new public-private partnership program, the National Network for Manufacturing Innovation (NNMI or Network). The proposed Network will be composed of up to fifteen Institutes for Manufacturing Innovation (IMIs or Institutes) around the country, each serving as a hub of manufacturing excellence that will help to make United States (U.S.) manufacturing facilities and enterprises more competitive and encourage investment in the U.S. This program was proposed in the President's fiscal year (FY) 2013

budget¹ and was announced by the President on March 9, 2012.² The NNMI program will be managed collaboratively by the Department of Defense, Department of Energy, Department of Commerce's NIST, the National Science Foundation, and other agencies. Industry, state, academic and other organizations will co-invest in the Institutes along with the NNMI program. For purposes of this notice, "co-invest" means that non-federal entities will contribute financial and other resources to the Institutes to complement federal investments.

DATES: Comments are due on or before 11:59 p.m. Eastern Time on October 25, 2012.

ADDRESSES: Comments will be accepted by e-mail only. Comments must be sent to nnmi_comments@nist.gov with the subject line "NNMI Comments."

FOR FURTHER INFORMATION CONTACT: Dr. Michael Schen, 301-975-6741, michael.schen@nist.gov, or Mr. Prasad Gupte, 301-975-5062, prasad.gupte@nist.gov

¹ See <http://www.whitehouse.gov/sites/default/files/omb/budget/fy2013/assets/budget.pdf>, page 217.

² See <http://www.whitehouse.gov/the-press-office/2012/03/09/remarks-president-manufacturing-and-economy>

SUPPLEMENTARY INFORMATION:

The Challenge

Numerous recent reports have highlighted the critical role of manufacturing to innovation,³ jobs,^{4,5} the economy,⁶ exports,^{7,8} and national security.⁹ Current global trends raise serious concerns about U.S. competitiveness in manufacturing, including advanced manufacturing.¹⁰

The Nation's trade balance for advanced technology products has deteriorated precipitously over the past decade, adding to the overall U.S. trade deficit in manufacturing.¹¹ One key source of the competitiveness challenge is a gap between research and development (R&D) activities and the deployment of technological innovations in domestic production of goods.¹² Many technologies fail to move to commercialization or reach full scale-up in the U.S. because the domestic private sector, particularly small and medium-sized enterprises (SMEs), finds that the

³ President's Council of Advisors on Science and Technology (2011) [*Report to the President on Ensuring Leadership in Advanced Manufacturing*](#)

⁴ Bureau of Labor Statistics, *2011 Employer Costs for Employee Compensation*, Table 6.

⁵ National Science Board, *Science and Engineering Indicators 2012*, Appendix Table 4-14 and Table 3-32.

⁶ Bureau of Economic Analysis, *2010 U.S. Economic Accounts by Industry*, see <http://www.bea.gov/industry/index.htm>.

⁷ Bureau of Economic Analysis, *Industry-by-Industry Total Requirements Table*, see <http://www.bea.gov/industry/iotables/prod/>.

⁸ Bureau of Economic Analysis and Census, *U.S. International Trade in Goods and Services*

⁹ National Science and Technology Council (2012) *A National Strategic Plan for Advanced Manufacturing*, http://www.whitehouse.gov/sites/default/files/microsites/ostp/iam_advancedmanufacturing_strategicplan_2012.pdf.

¹⁰ R. Atkinson and S. Andes, *The Atlantic Century II: Benchmarking E.U. and U.S. Innovation and Competitiveness*. Washington, DC: Information Technology and Innovation Foundation, 2011.

¹¹ NSTC (2012) *Advanced Manufacturing*

¹² Deloitte Consulting LLP, Manufacturing Institute (2011), *Boiling Point? The skills gap in U.S. manufacturing*.

risks of such investments are too great for an individual entity to make. The private sector also reports challenges in accessing key skills and technical infrastructure for demonstration and prototyping purposes.

The Response

To meet this challenge, the U.S. must build on its strengths, leverage its unique research, innovation, and workforce capabilities, and create an infrastructure for manufacturing innovation to ensure that the next generation of processes and products not only will be invented in the U.S., but scaled up and manufactured in the U.S. as well. The President has proposed that the federal government catalyze the creation of a NNMI as a central element of the U.S. response to the manufacturing competitiveness challenge.¹ In doing so, the President is building on recommendations made by his Council of Advisors on Science and Technology and a wide range of other experts and organizations.^{3,9,10}

The NNMI will be composed of up to fifteen IMIs located around the country. The Institutes will bring together large companies, small and medium enterprises (SMEs), academia, federal agencies, and the states to accelerate innovation through co-investment in industrially relevant manufacturing technologies with broad applications. They will take full advantage of existing infrastructure by integrating current capabilities and building new ones where needed to foster innovation that can impact the manufacturing sector on a large scale.

The objectives of the NNMI are to bridge the gap between applied research and product

development, provide shared assets to help companies gain access to cutting-edge capabilities and equipment, and create an unparalleled environment to continuously educate and train students and workers in advanced manufacturing skills. Each Institute will become a self-sustaining technical center of excellence, providing and integrating innovation resources that will help to make U.S. manufacturing facilities and enterprises more competitive and encourage investment in the U.S.

The NNMI program will be managed collaboratively by the Department of Defense (DoD), the Department of Energy (DOE), the Department of Commerce's NIST, the National Science Foundation (NSF), and other agencies. Industry, state, academic and other partners will co-invest in the Institutes. Should the NNMI be funded in FY2013, the federal government will make a \$1 billion, one time investment through the NNMI program in a series of competitive solicitations staged over several years. This start-up investment will help support initial expenses for up to 15 Institutes. Participating agencies will oversee the solicitations, select award recipients, provide technical assistance to applicants, and manage the awards from the NNMI program funding.

Institute Objectives and Attributes

Each Institute will integrate capabilities and facilities required to reduce the cost and risk of commercializing new technologies and to address relevant manufacturing challenges on a production-level scale. Each will have a well-defined technical focus and will be selected through a competitive process.

Additional attributes will include:

- Long-term partnership between industry (including small, medium, and large firms), educational institutions, non-government organizations, and state, regional and local economic development authorities;
- Flexibility to form integrated teams of industrial and academic experts from multiple disciplines to solve difficult problems and to develop the future workforce;
- Adaptability for education and workforce development at multiple levels, including K-12, professional credentialing, undergraduate and graduate education, and mentoring and professional development;
- Involvement of industry associations, professional societies, and economic development organizations for validation and linkages to broader industry and regional activities;
- Analytical capability to identify critical emerging technologies with transformational impact and operational capacity in translating these technologies into products and businesses for the market;
- Ability to engage and assist SMEs to effectively deploy technologies; and
- A sustained focus on innovation with a strong reputation for quality and success.

Examples of Potential Focus Areas

Each Institute will have a clear focus area that does not overlap with those of the other Institutes. The focus area could be an advanced material, a manufacturing process, an enabling technology, or an industry sector. The federal government does not intend to create or provide a complete list of focus areas for the NNMI. The NNMI solicitation will invite applicants to propose such areas. The following examples are meant only to be suggestive of focus areas that might serve

national needs and improve the competitiveness of a broad base of domestic manufacturers.

Example 1 (*Manufacturing Process*): Refining standards, materials, and equipment for additive manufacturing to enable low-cost, low-volume production using digital designs that can be transmitted from designers located anywhere.

Example 2 (*Advanced Materials*): Developing lightweight materials, such as low-cost carbon fiber composites (CFCs), that will improve fuel efficiency and performance of the next generation of automobiles, aircraft, ships, and trains.

Example 3 (*Enabling Technology*): Creating a smart manufacturing infrastructure and approaches that integrate low-cost sensors into manufacturing processes, enabling operators to make real-time use of “big data” flows from fully instrumented plants in order to improve productivity, optimize supply chains, and reduce wastage of energy, water, and materials.

Creating technology platforms for manufacturing Spintronics (spin-based electronics) devices and systems for next-generation electronics, and for new paradigms for manufacturing photonic assemblies for future all-optical networks and wireless communications.

Example 4 (*Industry Sector*): Improving biomanufacturing processes to enhance safety, quality, and consistency of bioproducts, such as pharmaceuticals or chemicals, by enabling rapid on-line sensing and analytical capabilities and creating new tools for process optimization, control and improvement to enable cost-effective production methods.

REQUEST FOR INFORMATION: The objective of this request for information is to assist the NIST-hosted AMNPO in the development of the new program should the NNMI be funded in FY 2013. The questions below are intended to assist in the formulation of comments, and should

not be construed as a limitation on the number of comments that interested persons may submit or as a limitation on the issues that may be addressed in such comments. Comments containing references, studies, research, and other empirical data that are not widely published should include copies of the referenced materials. All comments will be made publicly available.

The NIST-hosted AMNPO is specifically interested in receiving input pertaining to one or more of the following questions:

Technologies with Broad Impact

1. What criteria should be used to select technology focus areas?
2. What technology focus areas that meet these criteria would you be willing to co-invest in?
3. What measures could demonstrate that Institute technology activities assist U.S. manufacturing?
4. What measures could assess the performance and impact of Institutes?

Institute Structure and Governance

5. What *business models* would be effective for the Institutes to manage business decisions?
6. What *governance models* would be effective for the Institutes to manage governance decisions?
7. What membership and participation structure would be effective for the Institutes, such as financial and intellectual property obligations, access and licensing?
8. How should a network of Institutes optimally operate?
9. What measures could assess effectiveness of Network structure and governance?

Strategies for Sustainable Institute Operations

10. How should initial funding co-investments of the Federal government and others be organized by types and proportions?
11. What arrangements for co-investment proportions and types could help an Institute become self-sustaining?
12. What measures could assess progress of an Institute towards being self-sustaining?
13. What actions or conditions could improve how Institute operations support domestic manufacturing facilities while maintaining consistency with our international obligations?
14. How should Institutes engage other manufacturing related programs and networks?
15. How should Institutes interact with state and local economic development authorities?
16. What measures could assess Institute contributions to long term national security and competitiveness?

Education and Workforce Development

17. How could Institutes support advanced manufacturing workforce development at all educational levels?
18. How could Institutes ensure that advanced manufacturing workforce development activities address industry needs?
19. How could Institutes and the NNMI leverage and complement other education and workforce development programs?

20. What measures could assess Institute performance and impact on education and workforce development?

21. How might institutes integrate R&D activities and education to best prepare the current and future workforce?

Dated: April 30, 2012

Phillip Singerman
Associate Director for Innovation & Industry Services

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